

WHAT IS CLAIMED IS:

1. A digital protection and control device,
comprising:

5 a digital data merging unit configured to take in, via a
transmission medium, digital output from one sensor unit or a
plurality of sensor units detecting AC electricity quantities of
main circuits of substation main equipment and to merge the
inputted digital data;

10 a protection and control unit configured to output a
control signal for protection and control of said substation main
equipment based on the digital data outputted from said digital
data merging unit;

a communication unit for component control devices
15 configured to transmit to said protection and control unit
component monitor data outputted from one component control
device or a plurality of component control devices controlling
said substation main equipment, and to transmit the control signal
outputted from said protection and control unit to said component
20 control device(s), the component monitor data and the control
signal being transmitted via a transmission medium;

a process bus communication unit configured to relay data
to/from at least a part of said protection and control unit, said
communication unit for component control devices, and said
25 digital data merging unit from/to an external process bus; and

a parallel transmission medium configured to couple at
least parts of said digital data merging unit, said protection
and control unit, said communication unit for component control

devices, and said process bus communication unit to one another,
wherein data exchange among at least parts of said digital
data merging unit, said protection and control unit, said
communication unit for component control devices, and said
5 process bus communication unit is based on a multimaster mode.

2. A digital protection and control device as set forth
in claim 1,

wherein at least a part of data exchange among said digital
data merging unit, said protection and control unit, said
10 communication unit for component control devices, and said
process bus communication unit is based on a single master mode
instead of the multimaster mode.

3. A digital protection and control device as set forth
in claim 1,

15 wherein a transmissionbus coupling said digital data
merging unit, said protection and control unit, said
communication unit for component control devices, and said
process bus communication unit to one another, and a transmission
bus in said process bus communication unit are based on a common
20 transmission mode, and the transmission bus in said process bus
communication unit has a bridge.

4. A digital protection and control device as set forth
in claim 1,

wherein at least parts of said digital data merging unit,
25 said protection and control unit, said communication unit for
component control device, and said process bus communication unit
have a storage section that stores data and that is allocated to
a storage space of a bus coupling at least said parts to each other,

and data exchange between at least said parts is conducted in such a manner that data is transferred to the storage section based on the allocation.

5 5. A digital protection and control device as set forth
in claim 1,

 wherein said protection and control unit ~~executes~~ a
protective relay arithmetic operation based on a reference signal
for protective relay arithmetic operation whose period is
substantially integer times a period of a sampling signal used
10 by said sensor unit(s) for sampling detection of the AC
electricity quantities.

 6. A digital protection and control device as set forth
in claim 5, further comprising:

 a unit configured to generate a reference signal for time
15 synchronization synchronous with a reference signal used for
generating the sampling signal and to generate the reference
signal for protective relay arithmetic operation,

 wherein at least a part of the control over said substation
main equipment is synchronized with the reference signal for time
20 synchronization, and at least a part of the protection of said
substation main equipment is synchronized with the reference
signal for protective relay arithmetic operation.

 7. A digital protection and control device as set forth
in claim 1,

25 wherein said protection and control section transmits said
control signal with a predetermined period, and said component
control device monitors said substation main equipment based on
a timing at which said component control device receives the

control signal.

8. A digital protection and control device as set forth in claim 7,

wherein said protection and control unit cyclically
5 appends identification data to said control signal transmitted with the predetermined period, and said component control device generates a timing in accordance with presence or non-presence of the appending of the identification data to the received control signal and controls said substation main equipment at said
10 timing.

9. A digital protection and control device as set forth in claim 1, further comprising:

a mechanical or static relay section configured to ON/OFF output the control signal to said component control device; and
15 an insulated input section configured to ON/OFF input said data input thereto from said component control device.

10. A digital protection and control device as set forth in claim 1:

wherein said digital protection and control device is
20 coupled to an external input/output device by a transmission medium, and exchange data with said component control device via said input/output device, the input/output device including a mechanical or static relay section ON/OFF outputting the control command to said component control device and an insulated input
25 section ON/OFF inputting thereto data input from said component control device.

11. A digital protection and control device as set forth in claim 1,

wherein at least a part of a transmission path of said digital protection and control device is constituted of an optical transmission portion, said digital protection and control device further comprising:

5 a fan unit configured to send an air to said optical transmission portion under a predetermined condition.

12. A digital protection and control device as set forth in claim 1,

 wherein the control signal to said component control device
10 from said digital protection and control device is a command constituted of a plurality of bits and constituted based on a predetermined rule, and said component control device receiving the command detects an error in the command.

13. A digital protection and control device as set forth
15 in claim 1,

 wherein said protection and control unit is divided into a device having a protection function and not having a control function and a device having the control function and not having the protection function.